

CLAIMS:

1. A method for forming extrudate having substantially uniform thickness comprising:
forming a shim with a thickness variation of less than about 5 percent for a shim
having an average thickness of about 30 mil (762 microns) or less;
5 disposing the shim between a first die portion having a first surface and a second die
portion having a second surface, so as to form a slot between the first surface
and the second surface, the slot having a height dimension substantially the
same as the shim thickness; and
extruding flowable material through the slot.
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2. The method of claim 1 wherein the height of the slot has a variation in height
of about 1 percent or less along the width of the slot.
3. The method of claim 1 wherein the first die surface and the second die surface are
15 machined to improve the tolerance of the height of the slot.
4. The method of claim 1 wherein the step of forming the shim comprises:
securing a vacuum box assembly to a grinder chuck;
grinding a top surface of the vacuum box assembly;
20 disposing the shim on a vacuum box assembly;
applying a vacuum between the shim and the top surface of the vacuum box assembly
so as to fix the shim stock on the top surface; and
grinding a first surface of the shim with a grinder.
- 25 5. The method of claim 4 further comprising grinding a second surface of the shim.
6. The method of claim 4 wherein the grinder is capable of less than 80 microinch runout
over an 80 inch length.

7. The method of claim 4, and further comprising:
disposing an adhesive material in a groove in the top surface so as to engage the top
surface and the shim.
- 5 8. The method of claim 4 and further comprising:
cutting the shim, wherein the method of cutting the shim is selected from the group
consisting of laser cutting, water jet cutting and EDM wire cutting.
9. The method of claim 8 wherein the step of cutting the shim occurs after the step of
10 grinding the shim.
10. The method of claim 4 wherein the shim material is selected from the group consisting
of plated nickel sheet material, brass, stainless steel, magnetic stainless steel.
- 15 11. The method of claim 4 wherein the shim material is comprised of a machinable metal.
12. The method of claim 1, and further comprising:
disposing standoffs between the first die portion and the second die portion so as to
form a recess between the first die portion and the second die portion;
20 extending a fastener through the recess;
providing a clamping force between the first die portion and the second die portion
utilizing the fastener;
supportably engaging the fastener with a first bracket;
distributing at least a portion of the clamping force of the fastener through the first
25 bracket; and
minimizing the bending of the first die portion.

13. The method of claim 12 and further comprising:
supportably engaging the fastener with a second bracket disposed against the second
die portion;
wherein the first bracket is disposed against the first die portion; and
5 distributing substantially all of the clamping force of the fastener such that the
clamping force acts through the first die portion and the second die portion
through areas other than the recess.
14. The method of claim 1 and further comprising:
10 disposing standoffs between the first die portion and the second die portion so as to
form a recess between the first die portion and the second die portion;
extending a fastener between the first die portion and the second die portion such that
the fastener does not extend through the recess; and
utilizing the fastener to provide a clamping force between the top die portion and the
15 bottom die portion.
15. The method of claim 4 and further comprising:
disposing a layer of magnetic plastic material on the top surface of the vacuum box
assembly.
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16. A method for extruding comprising:
forming a shim with a varying thickness profile;
disposing the shim in a die, between a first die portion having a first surface and a
second die portion having a second surface, so as to form a slot between the
25 first surface and the second surface, the slot having a varying height
dimension, which substantially corresponds to the shim profile;
extruding flowable material through the slot; and
wherein varying the shim profile compensates for variations in at least one of the
material fluid rheology, flow rates of material through the die, shape of a
30 manifold in the die and slot design of the die to obtain extrudate having
substantially uniform thickness.

17. The method of claim 16 wherein the shim profile is such that the thickness varies in a manner selected from a group consisting of: incrementally thicker approaching the middle of the width dimension of the shim, incrementally thinner approaching the middle of the width dimension of the shim, and incrementally increasing in thickness along the width dimension of the shim.

18. The method for extruding uniform extrudate comprising:
disposing standoffs between a first die portion and a second die portion in a die so as
to form a recess between the first die portion and the second die portion;
extending a fastener through the recess;
providing a clamping force between the first die portion and the second die portion
utilizing the fastener;
supportably engaging the fastener with a first bracket;
distributing at least a portion of the clamping force of the fastener through the first
bracket; and
minimizing the bending of the first die portion.

19. The method of claim 18 and further comprising:
supportably engaging the fastener with a second bracket disposed against the second
die portion;
wherein the first bracket is disposed against the first die portion; and
distributing substantially all of the clamping force of the fastener such that the
clamping force acts through the first die portion and the second die portion
through areas other than the recess.

20. A method for extruding uniform extrudate comprising:
disposing standoffs between a first die portion and a second die portion in a die so as
to form a recess between the first die portion and the second die portion;
extending a fastener between the first die portion and the second die portion such that
5 the fastener does not extend through the recess; and
utilizing the fastener to provide a clamping force between the top die portion and the
bottom die portion.

21. A method for forming extrudate having substantially uniform thickness comprising:
10 forming a shim with a thickness variation of about 5 percent or less for a shim having
an average thickness of about 30 mil (762 microns) or less;
disposing the shim between a first die portion having a first surface and a second die
portion having a second surface, so as to form a slot between the first surface
and the second surface, the slot having a height dimension substantially the
15 same as the shim thickness;
disposing standoffs between the first die portion and the second die portion so as to
form a recess between the first die portion and the second die portion;
extending two fasteners through the recess;
providing a clamping force between the first die portion and the second die portion
20 utilizing the fasteners;
supportably engaging the fasteners with a first bracket;
distributing at least a portion of the clamping force of the fasteners through the first
bracket so as to minimize the bending of the first die portion;
wherein the height of the slot has a total indicated runout of about 4 microns or less
25 along the width of the slot; and
extruding flowable material through the slot.

22. The method of claim 21 wherein the step of forming a shim comprises:
- securing a vacuum box assembly to a grinder chuck;
 - grinding a top surface of the vacuum box assembly;
 - disposing the shim on the vacuum box assembly;
 - 5 applying a vacuum between the shim and the top surface of the vacuum box assembly
so as to fix the shim on the top surface;
 - grinding a first surface of the shim with a grinder;
 - removing the vacuum from between the shim and the top surface;
 - disposing the first surface against the top surface of the vacuum box assembly;
 - 10 applying a vacuum between the first surface and the top surface so as to fix the shim
on the top surface; and
 - grinding the shim with a grinder.